

Name: _____

at1119paper: Complete the Square, $b = \text{odd}$ (v502)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 27x = -176$$

Add $\left(\frac{-27}{2}\right)^2$, which equals $\frac{729}{4}$, to both sides of the equation.

$$x^2 - 27x + \frac{729}{4} = \frac{25}{4}$$

Factor the left side.

$$\left(x + \frac{-27}{2}\right)^2 = \frac{25}{4}$$

Undo the squaring.

$$\begin{array}{lll} x + \frac{-27}{2} = \frac{-5}{2} & \text{or} & x + \frac{-27}{2} = \frac{5}{2} \\ x = \frac{27-5}{2} & \text{or} & x = \frac{27+5}{2} \\ x = 11 & \text{or} & x = 16 \end{array}$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 + 35x = 294$$

$$x^2 + 35x + \frac{1225}{4} = \frac{2401}{4}$$

$$\left(x + \frac{35}{2}\right)^2 = \frac{2401}{4}$$

$$\begin{array}{lll} x + \frac{35}{2} = \frac{-49}{2} & \text{or} & x + \frac{35}{2} = \frac{49}{2} \\ x = \frac{-35-49}{2} & \text{or} & x = \frac{-35+49}{2} \\ x = -42 & \text{or} & x = 7 \end{array}$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 23x = 1274$$

$$x^2 + 23x + \frac{529}{4} = \frac{5625}{4}$$

$$\left(x + \frac{23}{2}\right)^2 = \frac{5625}{4}$$

$$x + \frac{23}{2} = \frac{-75}{2}$$

or

$$x + \frac{23}{2} = \frac{75}{2}$$

$$x = \frac{-23 - 75}{2}$$

or

$$x = \frac{-23 + 75}{2}$$

$$x = -49$$

or

$$x = 26$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 49x = -598$$

$$x^2 - 49x + \frac{2401}{4} = \frac{9}{4}$$

$$\left(x - \frac{49}{2}\right)^2 = \frac{9}{4}$$

$$x - \frac{49}{2} = \frac{-3}{2}$$

or

$$x - \frac{49}{2} = \frac{3}{2}$$

$$x = \frac{49 - 3}{2}$$

or

$$x = \frac{49 + 3}{2}$$

$$x = 23$$

or

$$x = 26$$